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Cavitation induced by high speed impact of a solid surface on a liquid jet¹ MOHAMED FARHAT, MARC TINGUELY, MATHIEU ROUVINEZ, Ecole Polytechnique Federale de Lausanne — A solid surface may suffer from severe erosion if it impacts a liquid jet at high speed. The physics behind the erosion process remains unclear. In the present study, we have investigated the impact of a gun bullet on a laminar water jet with the help of a high speed camera. The bullet has a flat front and 11 mm diameter, which is half of jet diameter. The impact speed was varied between 200 and 500 ms⁻¹. Immediately after the impact, a systematic shock wave and high speed jetting were observed. As the compression waves reflect on the jet boundary, a spectacular number of vapour cavities are generated within the jet. Depending on the bullet velocity, these cavities may grow and collapse violently on the bullet surface with a risk of cavitation erosion. We strongly believe that this transient cavitation is the main cause of erosion observed in many industrial applications such as Pelton turbines.

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Mohamed Farhat
Ecole Polytechnique Federale de Lausanne

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